Full geomagnetic field determination of two brick kilns, Osterietta (Northen Italy).

Evdokia Tema[1], Pierre Camps[2], Enzo Ferrara[3]

[1]Università degli Studi di Torino, Italy
[2]Géosciences Montpellier, CNRS and Université Montpellier 2, France
[3]Istituto Nazionale di Ricerca Metrologica, Torino, Italy

Corresponding author: evdokia.tema@unito.it

Abstract: During the last decade, several archaeomagnetic studies have shown that archaeomagnetism can be a valuable dating tool for archaeology, particularly for the areas where a detailed reference SV curve is available and for the cases where no organic material is available for radiocardon dating. However, most of the available up to now studies are mainly based on the determination of the direction of the Earth's magnetic field while only few of them include also archaeointensity analysis, most probably because of its more complicated experimental determination.

In this paper, we present a detailed rock-magnetic and archaeomagnetic study of two rescue excavation brick kilns (named OSA and OSB) discovered at the location of Osterietta, in Northen Italy. The magnetic properties of representative samples have been investigated though isothermal remanent magnetization (IRM) acquisition curves, thermal demagnetization of three-axes IRM components (Lowrie, 1990), hysteresis loops and low-field thermomagnetic curves in order to identify the type, size and the thermal stability of the studied samples and investigate their suitability for archaeomagnetic determinations. The full geomagnetic field vector has been determined and the archaeointensity for each kiln has been recovered with both the classical Thellier method and the multi-specimen procedure (MSP-DSC). The multi-specimen procedure was performed with a very fast-heating oven developed at Montpellier (France). The archaeointensity results obtained from both techniques are very similar, confirming the reliability of the new obtained data.

The full geomagnetic field vector (declination, inclination and intensity) obtained for each kiln has been used for the archaeomagnetic dating of the two structures after comparison with the reference secular variation curves calculated from the SCHA.DIF.3K model (Pavón-Carrasco et al., 2009). The dating results have been calculated using the Matlab archaeo_dating tool (Pavón-Carrasco et al., 2011) and they

suggest that the OSA kiln was for last time used between 1761-1841 AD and the OSB kiln between 1752-1831 AD, with 95 % of probability.

Keywords: Secular variation; geomagnetic field vector; archaeomagnetic dating; Italy

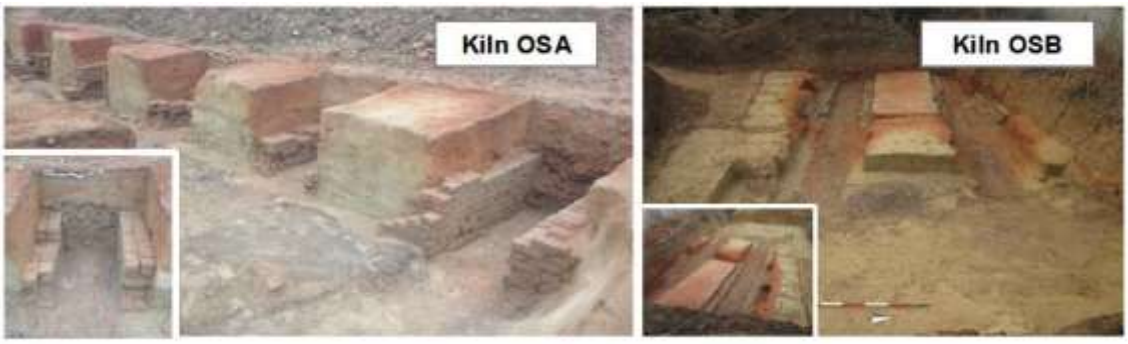

Figure 1: General view of the two studied kilns (OSA and OSB) excavated at Osterietta, Northern Italy.

References :

Lowrie, W., 1990. Identification of ferromagnetic minerals in a rock by coercivity and unblocking temperature properties. Geophys. Res. Lett., 17, 159-162.

Pavón-Carrasco, F. J., Osete, M.L., Torta, J. M., Gaya-Piqué, L. R., 2009. A regional archaeomagnetic model for Europe for the last 3000 years, SCHA.DIF.3K: applications to archaeomagnetic dating. Geochem. Geophys. Geosyst., 10 (3), Q03013.

Pavón-Carrasco, F.J., Rodriguez-Gonzalez, J., Osete, M.L., Torta, J., 2011. A Matlab tool for archaeomagnetic dating. J. Archeol. Sci., 38 (2), 408-419.